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Army contracting command workforce model analysis

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ARMY CONTRACTING COMMAND WORKFORCE MODEL ANALYSIS

by

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Abstract

The increasing pace of change in the federal acquisition environment coupled with a new emphasis on contracting accessions have increased the interest in the models utilized by the DoD to (1) measure the contracting workload, and (2) assign adequate resources to effectively manage the workload with an acceptable level of risk.

Numerous acquisition studies and commissions have cited personnel management as one of the most critical factors contributing to the success or failure of buying organizations. Strategic human capital management and DoD contract management have been on the Government Accountability Office (GAO) High-risk List for the last several years. Actions made toward understanding the optimal size and capabilities of the acquisition workforce are a first step toward the development and execution of an integrated strategic human capital management plan. Moreover, joint basing and Base Realignment and Closure (BRAC) requirements to merge and consolidate some contracting offices increase the importance of moving toward a workforce model that is applicable in the joint environment.

The primary goal of this report is to identify differing methods used to assess workload and staffing in Army contracting organizations, as well as in the Department of Defense (DoD), Federal Civilian, and other commercial contracting organizations. This report identifies the key elements of various DoD Services' contracting workforce staffing models. Furthermore, it investigates the rationale and assumptions utilized to develop these models. The validity and applicability of the rationale and assumptions to the current acquisition environment are discussed. This research investigates each of the Services' workload and resource assessment methodologies in the operational (and in some cases weapon system) contracting environments. Comparisons and contrasts of the various methodologies are discussed. In addition, industry practices in measuring workload and procurement organization production are reviewed. Opportunities to incorporate or adapt industry standards are discussed.

Secondary research goals include identifying potential opportunities whereby the existing methodologies can be used to more accurately capture the amount and nature of the work performed by contracting organizations; to ensure that the complexity of the work being performed at various stages within the contract process are reflected in the workload models; and to ensure that the level and quality of work is reflected in performance measurement models.

Keywords: contracting, workforce, model, human capital, Army, performance measurement, workload

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About the Author

Dr. Timothy Reed is a visiting professor at the Naval Postgraduate School, where he teaches master's courses in Acquisition Management and Corporate Entrepreneurship. He has also taught at the Air Force Institute of Technology (AFIT), where he created the Air Force Strategic Purchasing Graduate Degree Program and served as the director of the program for two years. In addition, he has taught at the University of Dayton, American University (Washington, DC), the University of Maryland (University College), and he has taught visiting seminars at American University in Cairo, and Instituto de Empresas in Madrid. Dr. Reed retired after 21 years in the Air Force, where he held various assignments in contracting, including the F-22 (EWI), C-17 and Fighter Engine Systems Program Offices. He deployed as the director of Joint Contracting Command-North, Kirkuk, Iraq. He also served at the Pentagon as Deputy Chief, Procurement Transformation Division, Headquarters Air Force, where he was responsible for implementing strategic sourcing and commodity councils for the DoD and the Air Force. In his final assignment as commander, 325th Contracting Squadron, Tyndall AFB, FL, he was responsible for $500 million in annual purchases in support of F-15, F-22 fighter aircraft, and Airborne Warning and Control System (AWACS) flight training. He earned a PhD in Strategic Management and Entrepreneurship from the University of Colorado and is a certified purchasing manager (C.P.M.) with the Institute of Supply Management.

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Table of Contents

I. Introduction

This study focuses on identifying methods used to assess the workload of Government contracting personnel. In its most basic form, this research seeks to move the field toward answering the question, "What size should my contracting organization be?" I acknowledge at the outset that the answer to this quantitative question is not in itself sufficient for organizational success. It is not simply the number of workers, but also the competencies of those workers that is essential in meeting mission requirements. However, competency assessment is not the subject of this research. Rather, the primary goal of this research is to identify differing methods used to assess workload and staffing in Army contracting organizations, as well as in the Department of Defense (DoD), Federal Civilian, and other commercial contracting organizations.

Mr. Jeffrey Parsons, the executive director of the recently formed Army Contracting Command (ACC) headquartered at Ft Belvoir in Northern Virginia, asked the Naval Postgraduate School (NPS) to undertake this study to explore options for consistent measurement of contracting organization workload, and the commensurate application of contracting workforce resources to identified workloads. Numerous acquisition studies and commissions have cited workforce management as one of the most critical factors contributing to the success or failure of buying organizations. Furthermore, strategic human capital management and DoD Contract Management have been on the Government Accountability Office (GAO) High-Risk List for the last several years. Moreover, joint basing and Base Realignment and Closure (BRAC) requirements to merge and consolidate some contracting offices increases the importance of moving toward a workforce model that is applicable in the joint environment. Implementing a process to determine the required levels of contracting organization staffing are important in the development and execution of an integrated, strategic, human capital management plan.

This report identifies the key elements of various DoD Services' contracting workforce staffing models. Furthermore, it investigates the rationale and

assumptions utilized to develop these models. The strengths and weaknesses of the models are discussed. This research investigates each of the Services' workload and resource assessment methodologies and includes various models used in the operational, (and in some cases weapon system) contracting environments. Models of contracting workload in contingency environments were not the focus of this study, however many of the findings are applicable to all contracting organizations. Comparisons and contrasts of the various methodologies are discussed. In addition, industry practices in measuring workload and procurement organization production are reviewed. Opportunities to incorporate or adapt industry standards are discussed.

Secondary research goals are to identify potential opportunities whereby the existing methodologies can be used to more accurately capture the amount and nature of the work performed by contracting organizations; to ensure that the complexity of the work being performed at various stages within the contract process are reflected in the workload models; and to ensure that the level and quality of work is reflected in performance measurement models.

The Army Contracting Command was officially established on October 1, 2008, with Mr. Jeffrey Parsons as the executive director. This new Command essentially combined all of the contracting elements of the Army Materiel Command (AMC) (which includes such major subordinate commands as the Tank-Automotive & Armaments Command, the Communications Electronics Command, and the Aviation & Missile Command) with the contracting group in the former Army Contracting Agency. This new Command started with approximately 4,100 civilians, (of whom approximately 3,500 were contracting personnel in the GS-1102 occupational career field), and 310 military officers and enlisted soldiers located around the globe. In 2010, there were approximately 5,300 military and civilian personnel in the ACC operating at 117 locations world-wide. The ACC expects to grow by approximately 25% over the next several years.

The research methodology used in this report consisted of two principal aspects. First, a review of the literature on workforce planning, workload assessment, and manpower modeling was conducted. The literature review included defense acquisition workload measurement reports, workforce studies, Federal Government workforce studies and reports, and human capital research and reports. Prominent organizations that have contributed to the open literature relevant to this study have been the RAND Corporation (which is a Federally Funded Research and Development Center [FFRDC] for the DoD), the Government Accountability Office (GAO), the Federal Acquisition Institute (FAI), and various university and government research groups.

Second, a review of the models currently in use and used in the past by DoD organizations, civilian contracting agencies, and industry best practices was conducted. These reviews led to an assessment of the strengths and weaknesses of existing models, and to options for implementation. While the findings are directly relevant to the ACC, the findings also apply to other organizations that conduct contracting activities in the operational, systems acquisition, and contingency environments.

A comparison of the results obtained from the various models through sample scenarios was originally intended for this research. The intention was to input actual organization data into various models and compare the results received from the various models. A review of the various data requirements of the models in the study revealed that the dissimilar types of data required by the various models rendered the comparison of models with actual data impractical.

Following the Introduction section, this report is organized into the following sections: Literature Review, Discussion Items, Findings, Recommendations, Bibliography, and Appendices.

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II. Literature Review

A review of the literature revealed that it is conventional wisdom that growth in the DoD acquisition workforce is a necessity (e.g. .Acquisition Advisory Panel, 2007; Gansler 2007; DoD, 2010). While subjective rationale is provided in the workforce planning literature, no quantitative basis for the specific growth figures was identified. The Defense Business Board (2010) provides the broad logic for the growth.

> Between 2010 and 2015, DoD will grow its DAW [Defense Acquisition Workforce] by 20K (from 127K to 147K), more than 15 percent. Ten thousand (10K) of the total will be from contractor conversions (insourcing) and 10K will be new hires (new billets). This increase will restore the DAW to late 1990s levels and is intended to restore core capabilities. (Defense Business Board, 2010 p. 5)

This leads to the following questions: If there is no answer to why 20,000 more positions is the correct number, then how do we know to which Service or buying office the new positions should be assigned? How do we know which offices are currently adequately staffed and which offices are critically under staffed? What will be the most effective method to allocate these new positions to the offices with the greatest need?

In order to answer these questions, the DoD requires a workload assessment model and a resource allocation model based on the projected workload of a buying office. While it may not be practical to implement a DoD-wide solution, a robust model for each Service; major command; or agency should be attainable. I sought to provide the basis for an examination of potential solutions through a review of the applicable literature.

The primary sources of literature regarding the contracting workforce are: (1) the Government Accountability Office (GAO), focusing principally on strategic human capital management and acquisition workforce issues; (2) the RAND Corporation, focusing principally on workforce planning; (3) the Federal Acquisition Institute (FAI), which, among other things, surveys the federal contracting workforce; (4) the Office

of Federal Procurement Policy (OFPP); (5) Department of Defense (DOD) reports, directives, and instructions regarding acquisition career management; and (6) non-governmental publications from both practitioners and scholars.

This report is a continuation of the research stream relating to the Army acquisition workforce begun in 2008 and published in *Demographics of the Contracting Workforce within the Army Contracting Command* (Lamm & Reed, 2009).

Government Accountability Office

Over the past several years, the GAO has addressed a variety of aspects of the Defense acquisition workforce. These aspects include strategic human capital planning, agency hiring and training practices, integration between civilian and military workforces, workforce trends, private-sector principles, workforce size and structure, and DoD workforce reform and improvement efforts. GAO investigations continue to serve as a reminder of both the distance traveled on workforce strategy development, and the miles yet to go.

Most recently, in September 2010, the GAO released a report entitled *Human Capital: Further Actions Needed to Enhance DOD's Civilian Strategic Workforce Plan.* The audit report found that key requirements such as identifying funding for training civilian employees, analyzing workforce skill gaps, and assessing progress and results have not been fully addressed. The report also indicated that the current DoD plan does not specify the appropriate acquisition workforce makeup and has not developed guidance to help program offices meet workforce planning objectives. (GAO, 2010).

The report cites the 2010 *Quadrennial Defense Review (QDR)* as seeking "an appropriately sized cadre of acquisition personnel who have the skills and training necessary to successfully perform their jobs" (GAO, 2010, p. 2). However, there is neither guidance as to what size an appropriately sized cadre should be, nor how to determine the appropriate size.

The GAO did identify several workforce models and software applications used to forecast future changes in the workforce, but not workload requirements. These applications include the Office of Personnel Management's (OPM) workforce forecasting software, Workforce Analysis Support System (WASS) and Civilian Forecasting System (CIVFORS). WASS is used to evaluate workforce trends using such characteristics as employee age and retirement plan participation. The OPM also conducts the Federal Employee Viewpoint Survey, which measures employees' perceptions of how successful their agencies are in key performance areas. The survey results can be sorted by agency and topic and are available for public access at the OPM's website (http://www.fedview.opm.gov/).

CIVFORS was adapted from an Army military forecasting model for civilian use in 1987 and uses data from the DoD's Defense Civilian Personnel Data System (DCPDS) (GAO, 2010). CIVFORS is a life cycle modeling and projection tool, which models most significant events, including personnel actions such as promotions, reassignments, and retirements. Officials can use a default model scenario or develop their own. The forecasts cover a seven-year projection period. CIVFORS is used at the DoD level, but it is not mandated at the Service level. As a result, each Service may use various systems and approaches for their workforce projection forecasts (GAO, 2010).

Acquisition workforce management data are collected and stored in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) Workforce Data Mart. Data Mart is a centralized data warehouse that serves as a single repository for all acquisition workforce data collected from the Military Personnel Data System, DCPDS, and other external sources. Data Mart is used for workforce counts, human capital strategic plans, course demand management, and for the monitoring of certification rates. The DoD conducts workforce forecasting based on acquisition workforce information. Forecasting of gain and loss levels was supported by RAND and an internal workforce forecasting tool (GAO, 2010).

GAO reports over the previous ten years capture the evolution of DoD workforce planning initiatives. In January 2001, the GAO designated strategic human capital management as a government-wide high-risk area in its High-Risk Series because “serious human capital shortfalls are eroding the ability of many agencies, and threatening the ability of others, to economically, efficiently, and effectively perform their missions” (GAO, 2001a, p. 72). The major problem is not federal employees but rather the “lack of a consistent strategic approach to marshaling, managing, and maintaining the human capital needed to maximize government performance and ensure its accountability” (GAO, 2002a, p. 4). In a prelude to a human capital model, this report outlined four pervasive human capital challenges as follows: (1) leadership, continuity, and succession planning; (2) strategic human capital planning and organizational alignment; (3) acquiring and developing staffs whose size, skills, and deployment meet agency needs; and (4) creating results-oriented organizational cultures. These became the four cornerstones of the GAO’s model. It outlined three immediate steps to manage human capital as follows: (1) identify and make use of all appropriate administrative authorities (available in *Human Resource Flexibilities and Authorities in the Federal Government*, OPM, 2008); (2) pursue incremental legislative reforms to supply additional tools and flexibilities to hire, manage, and retrain personnel, particularly in critical occupations; and (3) identify the kinds of needed comprehensive legislative reforms which place greater emphasis on skills, knowledge, and performance in connection with employment and compensation decisions (GAO, 2002a, p. 5). The report goes on to identify eight critical success factors associated with the four human capital cornerstones mentioned earlier (commitment to human capital management; role of the human capital function; integration and alignment; data-driven human capital decisions; targeted investments in people; human capital approaches tailored to meet organizational needs, empowerment and inclusiveness; and unit and individual performance linked to organizational goals) (GAO, 2002a, p. 8).

RAND Corporation

The RAND Corporation has been actively involved in identifying the challenges of workforce planning in the DoD. The collection of RAND studies is noteworthy for the identification of both quantitative and qualitative gaps in workforce planning.

One such report titled *An Operational Process for Workforce Planning* is one of the products of a project undertaken for the Office of the Secretary of Defense (OSD) within RAND's National Defense Research Institute (Emmerichs, Marcum, & Robbert, 2004b). Beginning with the recommendations of the DoD Acquisition 2005 Task Force's final report, *Shaping the Civilian Acquisition Workforce of the Future* (OSD, 2000), which called for the development and implementation of needs-based human resource performance plans for the DoD civilian workforce, RAND developed a user's guide for those conducting workforce planning within acquisition organizations. The methodology is described primarily in terms of its application at a business unit level based on a review of workforce planning in both governmental and private-sector organizations. The report summary states that "workforce planning is an organizational activity intended to ensure that investment in human capital results in the timely capability to effectively carry out the organization's strategic intent" (Emmerichs et al., 2004b, p. ix). Strategic intent is usually implicit and is an expression of what the leadership believes the business of the organization is and how that business will be accomplished through goals, guiding principles, and/or strategies. "A major task for workforce planners is to identify explicitly those elements of strategic intent that workforce characteristics help accomplish" (Emmerichs et al., 2004b, p. ix). In addition to identifying the major purposes of workforce planning (the goal-oriented view), the structural view presents four questions central to workforce planning:

1. What critical workforce characteristics will the organization need in the future to accomplish its strategic intent, and what is the desired distribution of these characteristics?

2. What is the distribution—in today's workforce—of the workforce characteristics needed for the future?

3. If the organization maintains current policies and programs, what distribution of characteristics will the future workforce possess?

4. What changes to human resource management policies and practices, resource decisions, and other actions will eliminate or alleviate gaps (overages or shortages) between the future desired distribution and the projected future inventory? (Emmerichs et al., 2004b, p. xi)

The process view proposes a four-step process to workforce planning, which relies on comprehensive data and sophisticated models utilized in an ongoing dialogue among the business unit's senior leaders. Of particular note is the identification of the need for "sophisticated workload models (which help translate expected workloads into requirements for workers) and inventory projection models (which depict how the expected composition of a workforce will change over time)" (Emmerichs et al., 2004b, p. x.).

Emmerichs et al. (2004b) illustrate the important distinction between a model that predicts the changes in the size and competencies of the workforce over time versus one that models the work requirements that the organization will be expected to perform (ideally with advance notice).

Emmerichs et al. (2004b) found that accurate and relevant data are vital for the successful operation of workforce models. They recommended that while workforce planning is often best carried out at the business unit level, the identification of data, and the collection of data, is best accomplished at the headquarters level to ensure that comparable data are being used at the various business units. The authors also recommended that models be developed at the headquarters level for use at the business level to ensure that a standardized approach is being utilized.

Finally, Emmerichs et al.(2004b) provide a cautionary recommendation that the identification of workload factors and the implementation of any model be

conducted through discussions with stakeholders that allow qualitative information to be considered in addition to raw numbers.

> Although we do not argue that facilitated dialogue is the only means of carrying out the process, based on our experience (and as part of a similar process focused on organizational behavior), we believe it produces a synergy not available through a mechanistic procedure. (Emmerichs et al., 2004b, p. 36)

Another notable RAND study within its National Defense Research Institute is a report titled *Civilian Workforce Planning in the Department of Defense*, published in 2006. The study sought to describe the existing workforce planning process at individual military installations in order to identify challenges to workforce planning at these bases and to consider options for DoD-wide workforce planning and OSD support for installation-level planning. The four basic steps of the model developed by the study effort are: (1) forecast workforce requirements (staffing levels and competencies demanded in the future), (2) project workforce supply, (3) identify gaps between supply and demand, and (4) develop strategies that address key gaps. Six military sites were selected for in-depth analysis (Gates, Eibner & Keating, 2006, pp. xiv-xv). Only one base selected was an Army site. Noting that the DoD lacked a department-wide workforce planning process, RAND's study recognized that the DoD does possess a set of resources that would serve as a starting point for such planning. The Defense Civilian Personnel Data System (DCPDS) is used by installations for some types of supply analysis, but the key limitation of the existing data is a lack of information on skills and competencies (Gates et al., 2006, p. xvi). The study makes several recommendations to the OSD concerning its support of local-level workforce planning efforts—including an improvement in existing data systems and their use, promotion of the collection of requirements data, the creation of a more meaningful gap analysis process, and a move to better integrate workforce planning and budgeting processes (Gates et al., 2006, pp. xxii-xxiii). Although not specifically focused on contracting personnel, the study does provide insight into the issues associated with projecting workforce requirements and supply as well as gap analysis.

For the purposes of my research, it is useful to highlight the importance of step 1: forecast demand—or estimating staffing levels and competencies required in the future workforce. The outputs of demand planning in this context are *workforce requirements.* These requirements reflect the required number of positions and competencies that the workers must have. It is worth noting that throughout the literature review there is an emphasis placed on having not only the correct number of workers, but that the correct number of workers have the correct skills or competencies as well (Gates et al., 2006).

The findings of Gates et al. (2006) indicate that successful completion of the demand analysis step is essential to successful workforce planning. In this study, the researchers found demand analysis to be much more challenging in DoD organizations due to the difficulty that organizations have in estimating customer demand. Furthermore, organizations varied significantly in their ability to translate customer demand into estimates of required workforce (Gates et al., 2006).

Gates et al. discovered that unlike some non-governmental agencies with fewer manpower restrictions, customer demand is not the only factor that managers must consider in assessing DoD workforce demand.

> In the DoD, local managers face constraints on the total number of civilian work years they are allowed, as well as the total wage bill for civilian personnel. These additional constraints complicate gaps analysis, because local managers must be conscious of at least two gaps: that between the required (the estimated workforce needed or required to accomplish the organization's goals) workforce and the workforce supply, and that between the budgeted (the workforce that can be supported with resources that have been budgeted for civilian personnel in that organization) workforce and the workforce supply. (Gates et al., 2006 p. 47)

In summary, demand analysis involves two important types of data:

- projections of customer demand and
- data that allow that demand to be translated into workforce requirements.

In other words, there must be a set of workload factors or process times that allow the researcher to interpolate the raw demand information into workforce requirements.

The researchers found that a lack of data, both on the skills and competencies of the workforce and on customer demand, limits workforce planning throughout the DoD. In their assessment, additional data collection would be required to support a DoD-wide demand analysis, and a gap analysis in particular. However, they found it important to weigh the cost of data collection, as the cost of data collection may sometimes outweigh the benefits. Leaders must assess both the cost of collecting the data and the value that the data bring to workload and performance assessment. Such an assessment will allow leaders to select data that provide the best value to the organization per the cost spent to collect the data.

In a report titled *The Defense Acquisition Workforce: An Analysis of Personnel Trends Relevant to Policy, 1993-2006,* the RAND Corporation addressed planning issues involving both the civilian and military acquisition workforce. This study was undertaken at the request of the Director, Acquisition, Technology, and Logistics (AT&L), Human Capital Initiatives (HCI) in the Office of the Under Secretary of Defense (AT&L). Using the Defense Manpower Data Center (DMDC) as a primary source of inventory demographic data, RAND tracked acquisition employees from late 1991 to late 2006. The report makes the following recommendations: (1) better definition and tracking of the acquisition workforce would improve workforce planning; (2) more detailed analysis of the current acquisition workforce and historical trends could yield additional insight; and (3) workforce analysis is only one step in an overall strategic human capital planning effort (Gates et al., 2008, p. xi). The study presents an acquisition workforce inventory projection model that can be used to project the characteristics and size of the workforce in the future based on the size of the current inventory and historical turnover information (p. 24). The key workforce factor used in the model is year of service. Starting with a beginning inventory and applying continuation rates (employees expected to remain in the workforce for an additional year) and gain and

separation/recategorization rates, the model presents how the workforce might appear at the end of each successive fiscal year. This model is available to DoD workforce planning personnel.

In 2009, Gates authored the RAND study *Shining a Spotlight on the Defense Acquisition Workforce—Again.* The study observed that in almost every instance that critics have criticized the acquisition workforce, they consistently identify its size, quality, and effectiveness as the key contributing factors to the observed problems (Gates, 2009).

One of Gates' three major focus areas in this report is of particular importance to this literature review. Specifically, her finding of a constant assessment that "the current workforce is too small to meet current workload" (Gates, 2009, p. 4). Gates notes that the Gansler Commission Report attributes recent contracting scandals to a lack of growth in the size of the Army contracting workforce combined with the exploding growth in the acquisition workload (Gansler, 2007, p. 30). However, Gansler uses the proxy of total contracting actions as the measure for workload, as opposed to a more detailed analysis. Furthermore, Gates points to *Report of the Acquisition Advisory Panel to the Office of Federal Procurement Policy and the United States Congress*, subsequently referred to in this chapter as the "Section 1423 Report," which stresses that the demands on the federal acquisition workforce have grown both in number and complexity since 1995 (Acquisition Advisory Panel, 2007).

Gates concludes that the key drivers of the increasing demands include:

> the complexity of service contracting, which is growing as a share of all government contracting; the fact that the number of transactions is no longer a good measure of workload; and the fact that best-value procurement approaches are substantially more complex than lowest-price contracting approaches. (Gates, 2009 p. 4)

The Section 1423 Report (Acquisition Advisory Panel, 2007) finds that workforce issues are only part of the problem. For example, in discussing the barriers to effective requirements determination, the Section 1423 Report

(Acquisition Advisory Panel, 2007, p. 7) not only points toward a strained workforce that lacks the requisite market expertise, but also to other factors that contribute to poor outcomes, such as a culture that emphasizes “getting to award,” budgetary pressures, time pressures, and unclear roles and responsibilities—particularly in the use of interagency or government-wide contracts. Gates concludes that:

> the demands placed on the acquisition workforce have outstripped its capacity. And while the current workforce has remained stable in the new millennium, there were substantial reductions in the 1990s accompanied with a lack of attention to providing the training necessary to those remaining to effectively operate the more complex buying climate. (Gates, 2009, p. 5)

The RAND investigation found that given the lack of available information on workforce requirements, size, quality, and mix that it was not possible to assess whether more workers, more highly skilled workers, or a different mix of workers would improve acquisition outcomes (Gates, 2009).

To conclude the review of the RAND report literature, I return to the questions I asked at the outset: Is the defense acquisition workforce really too small? And if so, what basis will we use to calculate the gaps and apportion resources to mitigate the gaps? Gates responds,

> To answer this question, one needs information about how many people are needed to accomplish the work (workforce demand) and how many people are currently part of the AW (acquisition workforce) (workforce supply). *No systematic data are currently available or referenced in workforce critiques on defense acquisition workforce demand* [emphasis added]. This is a key barrier to answering the question posed above since a characterization of the required workforce must anchor any assessment of whether the current workforce is too small or too large. Data on workforce supply exist, but they have serious limitations for accurately depicting trends in the size of the defense AW. Two limitations are of particular importance: (1) varying definitions of the organic (military and civilian) defense AW and (2) the absence of DoD-wide information on the number of contractors in the defense AW. (Gates, 2009, p. 15)

Federal Acquisition Institute

The Federal Acquisition Institute (FAI) focuses on establishing guidance and support for the federal acquisition community. A review of FAI reports and initiatives

has resulted in the identification of practices and tools, which could be leveraged in DoD acquisition workforce planning.

The FAI has taken a leadership position on broad-based competency assessment. The FAI issued a report presenting the results of its 2007 Contracting Workforce Competencies Survey. The survey targeted the GS-1102 series in the civilian agencies, including military personnel working outside the DoD performing contract specialist duties. Approximately 48% of the target population responded to the survey. The report analyzed proficiency levels regarding both general business and technical contracting competencies in various segments of the workforce—including educational level, years of experience, age, and training levels. The report stated that overall, contracting workforce technical competencies are at expected levels. “Of the 17 technical competencies surveyed, gaps requiring attention were identified in project management, defining requirements, and financial management. General business competency gaps were identified in influencing/negotiating and oral communications” (FAI, 2007, p. 2).

In 2008 the FAI conducted a follow-up competency survey, *2008 Acquisition Workforce Competencies Survey Results Report and Survey Content*, which revealed that the average response improved for each of the contracting competency areas (as well as for the contracting officer technical representative and for the program manager; FAI, 2009). An objective critique of the FAI competency assessment offers that any time self-reported competency assessments are conducted there is the risk of self-report bias and assessment inflation. Conducting objective interview or scenario based assessments with a sample of the population and comparing them to self-assessment scores would provide useful validation baselines regarding the accuracy of the self-reported competency assessments.

A year earlier, the FAI published the *Acquisition Workforce Human Capital Plan* (FAI, 2007). This document provided outlines, templates, and other guidance to assist agencies in the writing of Human Capital Plans. While much of the guide strives to address workforce imbalances and skill gaps, portions of the guide provide

reminders that workload assessment is also important. For example, one Human Capital Planning Strategy is to “ensure that the acquisition workforce human capital plan is used to set priorities for resource allocation, workload distribution and funding requests, within the context of the agency’s strategic plan” (FAI, 2007 p. 11). This strategy clearly requires that an assessment of agency workload occur before the workforce strategy can be adequately developed and applied. Under this plan, each agency was to establish a comprehensive model and overall process for acquisition workforce planning that addresses nine areas including, of note, “projected workforce imbalances and skill gaps; and workload analysis” (FAI, 2007 p. 13). If agencies are to complete workload analysis as part of this plan, it seems reasonable that a workload assessment tool should be made available.

In 2009, the Office of Federal Procurement Policy addressed the need for workload models in the *Acquisition Workforce Development Strategic Plan for Civilian Agencies—FY 2010–2014* (OFPP, 2009). To assist civilian agencies with preparing workforce plans, OFPP provided project model assistance along with the FAI:

Because agency missions and acquisition activities differ considerably, there is no simple formula that can relate the size and composition of an agency’s acquisition activity to its ideal workforce size. In developing a target acquisition workforce profile, agencies should examine their current acquisition management practices and determine where performance is hindered by insufficient resources. In particular, agencies should plan to increase the size of their acquisition workforce so long as the cost-savings and performance improvement benefits to taxpayers from better acquisition management exceed the cost of the additional acquisition employees. Additionally, FAI will develop and maintain an online toolkit for use by the agencies that will include various projection methodologies that agencies can use as part of their workforce analysis (OFPP, 2009, p. 9).

FAI has since established an online community that shares workload projection tools. In keeping with the OFPP’s assessment that the most appropriate

model may vary by agency, seven different model types have been made available. The models available include project-based, program-based, muti-dimensional, regression, volume-based, transaction, and conceptual-combination models. The specific characteristics of these models will be discussed further in the analysis section of this report.

Office of Federal Procurement Policy

Two major areas of influence (the Section 1423 Report and the *Acquisition Workforce Development Strategic Plan for Civilian Agencies—FY 2010–2014*) by the Office of Federal Procurement Policy (OFPP) have been discussed in the previous literature review sections. A more in-depth discussion of the Section 1423 Report is presented here.

The Acquisition Advisory Panel was authorized by Section 1423 of the Services Acquisition Reform Act of 2003. The panel was charged to review and recommend any necessary changes to acquisition laws and regulations as well as government-wide acquisition policies. In the Acquisition Advisory Panel's resulting report to the OFPP in 2007, they identified that in addition to the areas they were asked to review, they found that a review of the acquisition workforce was also required as it would be difficult to effectively improve other areas without taking significant action regarding the acquisition workforce. Specifically, they found that

> The federal acquisition workforce is an essential key to success in achieving the government's missions. Procurement is an increasingly central part of the government's activities. Without a workforce that is qualitatively and quantitatively adequate and adapted to its mission, the procurement reforms of the last decade cannot achieve their potential, and successful federal procurement cannot be achieved. (Acquisition Advisory Panel, 2007, p. 330)

Other findings of the panel included that the complexity of the federal acquisition system as a whole has markedly increased since the 1980s; that few agencies have systematically assessed their acquisition workforce; that procurement obligations grew by 60% in the past five years; that the qualitative nature of the procurement activity has also changed, placing greater demands on the acquisition

workforce for capability, training, time, and sophistication; that a significant shift from the acquisition of goods to the acquisition of services has occurred, placing additional demands on the acquisition workforce, in requirements definition, contract formation process, and in contract management (Acquisition Advisory Panel, 2007).

The panel also identified the changing nature of contracting processes as having a significant impact on the acquisition workforce. For example, the use of interagency awards and schedules to meet requirements has often allowed for the timely issuance of agreements, which allows a strained workforce to meet customer needs. However, the use of these schedules has contributed to other problems occurring from the failure of agencies to fully develop requirements, the failure to secure competition in using these vehicles, or the failure to manage contract performance under these vehicles (Acquisition Advisory Panel, 2007).

Other findings included the increased complexity involved with utilizing best-value awards as opposed to lowest price awards and the additional burden of past-performance assessment prior to award. In addition, the panel also identified that,

> both government-wide and agency-specific efforts to respond to the new challenges of today's acquisition system have focused on the nature of the skills required for success in today's contracting environment. They have not ascertained the number of personnel possessing those skills that are required given the level of present or future agency acquisition activity. (Acquisition Advisory Panel, 2007, p. 366)

The panel recognized the progress made in competency assessment by the FAI, but noted that the reports had not assessed workload demands for these competencies for the future, nor had they attempted at that time to assess the degree to which members of the existing federal procurement workforce possessed these capabilities (Acquisition Advisory Panel, 2007).

The panel recommended that Agency Chief Acquisition Officers should be responsible for measuring and predicting, to the extent possible, the agency's needs for procurement personnel. Further they stated clearly that "it is not sufficient simply to try to retain and manage existing personnel resources. Resources needed must

be identified and gaps between needed resources and available resources must be forthrightly acknowledged" (Acquisition Advisory Panel, 2007, p. 374).

The findings in the Section 1423 Report have had a direct influence on the actions taken by the OFPP to shape workforce planning and provide agencies with the tools that they need to positively affect their strategic human capital.

Department of Defense (Including Army Reports)

Pertinent to this research is the early warning signal regarding the acquisition workforce that was provided in a DoD report entitled *Shaping the Civilian Acquisition Workforce of the Future* (OSD, 2000). The report provided data describing a potential mass exodus from the DoD acquisition workforce and offered 32 significant recommendations to enhance the ability of management to address the problems identified. In 2005, the DoD published the Civilian Human Capital Strategic Plan 2006–2010. In this plan, the DoD laid out a goal to "ensure the Department systematically plans and forecasts workforce requirements to support the DoD mission with a trained and ready civilian force" (DoD, 2005, p. 11). It is interesting to note, however, that none of the proposed performance measures for this goal suggest that the appropriate size of the organization be determined. Demographic and trend data such as retention, turnover, staff ratios, customer satisfaction, training dollars, and competency gaps are proposed measures, but workload and appropriate size are not (DoD, 2005, p. D-2).

Subsequently, Section 851 of the National Defense Authorization Act of 2008 required the DoD to have a separate section in its Civilian Human Capital Strategic Plan (HCSP) on the acquisition workforce. The high visibility of this workforce is made clear because it is the only workforce that has been required to have a stand-alone, DoD-wide Human Capital Strategic Plan (Gates, 2009).

Perhaps the most well-known recent report related to Army Contracting is the 2007 *Commission on Army Acquisition and Program Management in Expeditionary Operations* report, widely referred to as "The Gansler Report" (Gansler, 2007). This

commission, empanelled by the Secretary of the Army, authored a forthright assessment of the impact on the Army of reducing the number of contracts specialists and simultaneously increasing the contracting workload by seven times. However, even this thorough assessment of the basis for some failures of Army expeditionary contracting uses a cursory proxy for "workload," defining it as the number of contract actions completed. While it is true that a seven-fold increase in even the most simplified workload measure will clearly stress a system, the obvious complexities and variability that occur when using completed contract actions as a workload measure leaves much to be desired (Gansler, 2007).

The *AT&L Human Capital Strategic Plan* (version 3.0) is a useful benchmark for human capital goals and initiatives in the DoD (USD[AT&L], 2007), although, some of this plan has been overcome by the recent suspension of the National Security Personnel System (NSPS) and the arrival of the new workforce management tools described later in this section.

More recently, the DoD has published the *DOD Strategic Human Capital Plan Update—The Defense Acquisition Workforce* (DoD, 2010). This document is prepared to meet the statutory reporting requirements established in multiple National Defense Authorization Acts. As such, it provides a tremendous amount of information on workforce demographics and strategies.

This report provides the best rationale found in this literature review for increasing the size of the acquisition workforce. Specifically, it states,

> The increase of approximately 20,000 [employees] will rebalance the organic acquisition workforce to better address inherently governmental and other critical functions. This will help mitigate the imbalance created by significant outsourcing of acquisition functions since the end of the Cold War. The DOD target to increase the size of the acquisition workforce was based on an integrated assessment of the following:
>
> 1. Alignment with the President's acquisition improvement initiatives and Department acquisition reform objectives;
>
> 2. Congressional engagement and perspectives on increasing the size of the defense acquisition workforce;

3. Senior leadership judgment relative to the need for a larger defense acquisition workforce to include Component and Functional Leader bottoms-up analysis;

4. The need to improve contract management and the Department's oversight capability;

5. Assessment of acquisition workforce decline since the mid 1990's;

6. The need to grow the organic workforce capability by rebalancing the Total Force mix;

7. An assessment of workload demand based on the dramatic increase in annual spend levels since 2001;

8. Results of the Dayton Aerospace SACOM reviews of major program offices in the Air Force and Navy;

9. Air Force assessment of their workforce assigned to major programs;

10. DOD competency assessment and bottoms-up review conducted by OSD and Component contracting leaders;

11. Internal DOD analysis of a variety of RAND studies on the acquisition workforce;

12. Numerous external studies, including GAO reports, which recommended DOD increase the size of the acquisition workforce;

13. The Defense Acquisition Workforce Structures and Capability review (Section 814, NDAA FY06);

14. Firsthand feedback from field level acquisition organizations. (DoD, 2010, p. 2-10)

These 14 subjective points serve as an argument that an increase in the size of the acquisition workforce will contribute to an increase in the effectiveness of mission performance. However, while a review of the open-source literature listed above found arguments for increasing the size of the acquisition workforce in general, no objective basis for the precise increase of 20,000 acquisition workforce employees was found.

Also pertinent to this research is the discussion of five planning tools discussed in the update report above. The first tool discussed in the update is the

Defense Acquisition Workforce Data Mart, which allows for real-time reporting of workforce count, certification level, etc. The second tool discussed is the PB23 Planned/Budgeted Acquisition Workforce tool, which shows by functional area the planned and budgeted future years. This tool is an important reminder that workforce is often driven by budget and vacancies on manning documents, rather than by workload. Should agencies conduct a workload analysis and find that workforce needs require adjustments in the Fiscal Year Defense Plan, they may submit updates for consideration. The third tool discussed in the update is the Inventory Projection Model. This RAND developed tool allows users to adjust planning factors to determine the impact of potential workforce policy changes on workforce size estimates. The fourth tool discussed, the Workforce Lifecycle Model (WLM), provides visual reports on three cohort groups: future (recent hires), mid-career, and senior-career groups. This tool allows for the analysis of demographic data within each of these groups. Finally, the Defense Acquisition Workforce Competency Initiative seeks to validate enterprise-wide acquisition competency models for each functional area. The resulting models enable workforce assessments, skill set gap analysis, the updating of training and performance support assets, and other workforce applications (DoD, 2010, p. 2–4). However, a review of this report found no mention of a tool to determine the workload of acquisition organizations.

One of the 14 sources cited as the basis for the 20,000 person increase in the acquisition workforce is the 2007 report published by the Defense Acquisition University, *Defense Acquisition Structures and Capabilities Review* (DAU, 2007). This report illustrates the demographic summary and trends in the acquisition workforce. However, it does not address workload assessment, other than to observe that

> measuring DoD acquisition workloads is an extremely complex task. Seemingly straightforward measures like the number of programs or contract actions are not necessarily reflective of the actual workload. For example, a major acquisition program requires considerably more work in terms of systems development, program management, and contract administration than a large number of smaller programs. In other cases, the opposite may be true.

> In spite of complex workloads, varying budgets, and changing mission priorities, the Department conducts both budgeting and planning efforts that affect the future acquisition workforce. (DAU, 2007, p. 3–9)

Another of the 14 sources cited as the basis for the increase of 20,000 people in the workforce, is the 2006 Department of Defense report, the *Defense Acquisition Performance Assessment Project*. This report makes extensive recommendations regarding changes to acquisition processes and recommends to "immediately increase the number of federal employees focused on critical skill areas, such as program management, system engineering and contracting" (DoD, 2006, p.12). However, there is no finding or recommendation relative to workload assessment.

DoD Instruction 1400.25, Volume 250 of the *DoD Civilian Personnel Management System* provides the overall policy guidelines and model program information regarding civilian personnel in the DoD. This instruction requires OSD Functional Community Managers (OFCMs) to 1) analyze "current and projected mission requirements (both expeditionary and non-expeditionary), environmental influences, attrition and retirement trends, and workload forecasts to identify current and future community manpower requirements" and to 2) "conduct inventory analysis of the numbers in the community against projected manpower needs to identify workforce gaps" (DoD, 2008, p. 6).

The U.S. Army Manpower Analysis Agency (USAMAA) at Fort Belvoir, Virginia, is responsible for providing assistance with the development of workload models and manpower policy. They provide several definitions which are of assistance to this report. USAMAA defines workload as: the major output, product produced, or service provided by a working element, normally a work center (USAMAA, 2009). The unit of measurement for workload is equal to the number of items produced or to the amount of service provided (called a workload count). Workload is further defined as the "amount of work assigned/directed to and expected to be accomplished by a worker or unit of workers in a given time period" (Army, 2006, p.13). To determine the number of employees or Full Time Equivalents (FTEs) required to meet the predicted workload, the Army divides total cumulative

organization workload hours by 1,740, the baseline standard for annual production hours per FTE (USAMAA, 2009).

USAMAA defines a workload driver as a programmable metric that has a meaningful influence on the amount of workload (output) that a work center needs to generate (USAMAA, 2009). A final definition to be considered here is *manpower requirements*, defined as human resources needed to accomplish a specified workload of organizations, expressed as number of people per time period (Army, 2006).

Thus, when predicting manpower requirements, the use of either total workload or workload drivers is appropriate. Either way, a calculation of the primary tasks associated with completing a major function are tabulated, multiplied by the standard time required for the task, or per accomplishment times (PAT), and then summed to compute the total workload time. When divided by the Army annual availability work standard of 1,740 discussed previously, the result is the number of FTEs required (USAMAA, 2009). This process assumes that the average organization member approximates the mean time to perform tasks. In organizations with more senior, experienced personnel one might reasonably assume that the time required per task would be lower than when compared with a less experienced staff, in which case the required time would be higher. The formula above does not take this factor into consideration (Army, 2009).

The Center for Advanced Purchasing Studies

The Center for Advanced Purchasing Studies (CAPS) sponsored by the Institute of Supply Management, works with industry supply management executives and academics to develop and share knowledge and best practices. It conducts recurring surveys and publishes regular reports on key areas of procurement and supply management. These publications allow commercial purchasing organizations to compare themselves with other organizations at a macro level as well as with organizations within their industry sector. Based on surveys of procurement

organizations, the CAPS provides a snapshot overview of 20 different key performance indicators (Wade, 2010).

Among the 20 industry variables that the CAPS tracks related to procurement, there are 11 that apply to both the public and private sectors:

1. The total dollars spent by a procurement organization as a percent of total firm budget (how much of an organization's needs are acquired via contract and what is procurement's relative impact/importance to the total organization);
2. Supply management operating expense as a percent of total spend (how much does it cost to spend each dollar of supplies or services that the organization procures); Congressional engagement and perspectives on increasing the size of the defense acquisition workforce;
3. Supply management operating expense per supply management employee (the total cost—pay, training, benefits, etc.—of the average member of the workforce);
4. Total spend per supply management employee (contract dollars awarded by the average procurement specialist);
5. Annual spend on professional training per supply management employee;
6. Professional training hours completed per supply management employee;
7. Supply management group retention rate;
8. Cost reduction savings as a percent of total spend;
9. Cost avoidance savings as a percent of total spend;
10. average order/action processing cost; and
11. average cycle-time (in days) from requirement approval to issuance of order/contract. (Institute of Supply Management, 2010)

Some of the interesting benchmarks in the 2006 CAPS report showed that the supply management operating expense per employee was $107,803. Operating

expenses per employee are calculated in different ways depending on the firm, but the measure includes employee salary at a minimum. The report also indicated that the number of supply management full time employees (FTEs), as a percent of all organization employees, was 1.1%. The breakout of supply management organizations by functional type included 23% in contract management, 25% in strategic sourcing, and 25% in transactional purchasing (IOMA, 2006, p. 18).

While industry practices vary from federal procurement practices, the industry response ranges and means provide useful benchmarks for organizations interested in comparing their results to determine where they stand relative to organizations in similar industries, such as the automotive or aerospace sectors.

Research from Other Non-Government Sources

Published research focused on measuring procurement organization workload and performance dates back to at least 1936. In that year, Lewis (1936) published *Standards of Purchasing Performance* in which he concluded that quantitative measures of procurement performance were not only possible but also useful.

Kudrna (1972) established that purchasing managers need precise methods to evaluate staff performance to allow for equitable distribution of workload. Cost reduction measures were developed by dividing the cost reduction in a specific period of time by the total purchasing spend in that period. An alternative measure of cost avoidance was also developed. The total amount of *expenses prevented* was divided by total purchases in a period. Kudrna also stressed that measuring the quality of the output was also important to consider, suggesting that the number of claims and orders rejected in a period would be useful proxies. He recommended that workload be assessed by assigning time units to types of activities (e.g., purchase order = 2 units; change notice = 1 unit). By dividing the total spend a buyer awarded by the time units of work completed by that buyer, a measure of buyer performance was developed (Kudrna, 1972).

Monczka and Carter (1978) produced a comprehensive set of 20 performance measures via a survey of 18 industry and government agencies. The types of measures found to be in use by procurement offices included (1) price effectiveness (the price achieved versus the amount budgeted for a procurement), (2) workload (workload received, current backlog of work, work completed), (3) cost savings (cost reduction and cost avoidance), (4) administration and control (number of staff required for workload), (5) vendor quality (cost of quality measures), and (6) efficiency (work accomplished per procurement specialist) (Monczka & Carter, 1978).

The two most important areas of measurement for this literature review are workload assessment and administration (Monczka & Carter, 1978). Workload measures in use sought to identify three key areas of work: work expected, work in progress, and work completed. Common methods of counting workload included the receipt of purchase requests, purchase requests in process, and protests received for processing in government agencies. Organizations converted cumulative workload measures to the number of days work on hand by dividing the cumulative workload backlog by the standard average work-day output. Most organizations used multiple work-completed measures, and “none thought that any one measure gave a complete picture of actual workload” (Monczka & Carter, 1978, p. 38).

In the area of administrative control, several findings are of particular interest to this report. The most common measure found to be in use to determine required staffing was to adjust the staff budget from the previous year depending on the budget, business forecast, or workload estimate of the next year. In this type of estimate, no formal methods were used to relate workload to headcount (Monczka & Carter, 1978). An alternative method is the use of a control ratio. In this method, the purchasing organization’s staff budget is calculated as a percentage of another measure, usually planned dollar expenditures. The calculation is accomplished by applying a ratio based on historical information to the base measure.

A third method identified for calculating required staff is to develop a workload standard for each buyer which would represent the average amount of work expected to be performed by each member of the organization. The expected incoming workload would then be divided by that standard, resulting in the required number of buyers (Monczka & Carter, 1978). A final method discussed was the assignment of the number of hours, or process time, to different types of activities, followed by the estimation of the workload in each of those activity types in order to ascertain the number of buyer hours required for the coming time period (Monczka & Carter, 1978).

In attempting to determine the best overall method, Monczka and Carter (1978) found that the answer was somewhere between control ratios and time standards.

> It appears reasonable to use aggregate standards (e.g., actions or spend per buyer) to help establish the necessary staffing levels. The control ratio is often out of phase with actual workload, and detailed time standards do not appear to yield results that are sufficiently superior in most purchasing departments to justify their development. (Monczka & Carter, 1978, p. 39)

In a study of 17 government procurement agencies at the county level, McCampell and Slaich (1995) found that two benchmarks provided insight into buying organization performance. The first measure is the average dollar volume obligated annually per professional staff member (buyer). The second measure is the mean cost per dollar obligated (McCampbell & Slaich, 1995).

The dollars-per-buyer measure was found to be superior to orders- or action-per–buyer measures due to an absence of what an *order* or *action* was defined as from organization to organization. The variability in these definitions substantiates the argument that the weights applied to variables should be made at lower organizational levels, as agency-wide weights and definitions would not be appropriate or reasonable for all contracting organizations within an agency. Furthermore, this measure could be manipulated by pursuing inefficient methods (issuing multiple orders rather than pursuing a more efficient consolidated order

process). Auditors may conclude that such a reduction in orders may provide a logical basis for staff reductions (McCampbell & Slaich, 1995). The study found that the average dollar volume obligated annually was $10.7 million, which is in the range found in the CAPS benchmarks ($3.4 million in aerospace to $47.9 million for food service; McCampbell & Slaich, 1995, p. 34).

The cost per dollar obligated (CPDO) benchmark was found to be particularly useful to the government sector. It is based on available information and it is easy to understand. The authors of this study also found that dollar-based calculations would be less likely to cause government auditors to mistake increased efficiency (fewer orders) as a cause for staff reductions (McCampbell & Slaich, 1995). CPDO would also be of interest to organizations pursuing consolidated buying strategies, as larger organizations using centralized or strategic sourcing processes are likely to achieve efficiencies in procurement. The limiting factor of applying CPDO in such an environment is that strategic sourcing efforts often take a great deal of upfront work, and then these efforts actually serve to reduce total dollars obligated, which has a negative impact on the measure. Another caveat would be to ensure that the measure is used in a competitive environment (to ensure award prices are not kept high to improve the metric) and in an aggregated fashion, rather than applying the measure to individual buyers (aggregation should ensure there is no skewing by individuals attempting to pursue “bad buying” practices; McCampbell & Slaich, 1995).

The study found that the mean CPDO was $0.0104, which is in the range found in the CAPS benchmarks, $0.002 to $0.05 (McCampbell & Slaich, 1995, p. 34).

Also in 1995, Black developed the Workload Index Model and published it in *Measuring Relative Productivity and Staffing Levels in a Federal Procurement Office.* Black’s model is an analytical attempt to compute a workload index that accounts for differences in the types of work and in the complexity of the work being performed (Black, 1995). Earlier models discussed used dollars obligated or orders

processed as the common basis for measurement. Black posits that non-weighted measures such as the average number of actions per employee, average dollars obligated per employee, and average days to process an action must be avoided (Black, 1995). His rationale is that these measures

> fail to account for the relative (weighted) differences in work tasks and staffing across offices examined. A small average number of procurements (or dollars) processed per staff member does not necessarily indicate poor performance; nor does a large average number of procurements (or dollars) processed per staff member necessarily indicate exceptional performance. (Black, 1995, p. 45)

Black (1995) addresses such concerns by calculating a workload index that divides the weighted workload of an organization by the weighted staff of the organization. The weighted workload is calculated by applying weights (standard mean days or hours required to complete a task type) to 18 categories of work actions. The weighted staff is calculated by weighting staff by their government service grade levels. The logic is that 40 GS-14 grade contract managers should be able to complete contract actions in greater quality and quantity than 40 GS-13 grade contract managers (Black, 1995). The resulting index allows for the comparison of organizations based on how much they are producing with the type of staff they have available.

Murphy, a faculty member at the Air Force Institute of Technology, teamed with Pearson and Siferd (1996) to develop a model for assessing procurement organization effectiveness. The model utilized four input measures: procurement organization operating expense (primarily driven by procurement staff salaries), total number of procurement staff, total number of administrative support staff, and the number of active suppliers (those providing goods or services within the past year). The model also utilized two organization output variables: procurement dollars, and procurement dollars as a percentage of total organization dollars (spend-to-budget ratio, discussed in more detail later in this section; Murphy, Pearson, & Siferd, 1996). The authors posit that by using a flexible weighting scheme that can accommodate

the varying importance of evaluation factors, managers are able to improve the assessment of organization performance (Murphy et al., 1996, p. 84).

Many sources for this research effort emphasized either a crisis in human capital planning and utilization (Liebowitz, 2004) or the importance of understanding the new principles, concepts, and perspectives in the theory and practice of human capital management (Farazmand, 2007; Burud & Tumolo, 2004; Picot, Saunders, & Sweetman, 2007; Hartog & Maassen van den Brink, 2007; Boudreau & Ramstad, 2007). Some sources also provide case studies, or "stories," that illustrate human capital assumptions, notions, attitudes, and beliefs (Kinter, Merrick, Morrison, & Voss, 1994; Burud & Tumolo, 2004).

In 2004, a study of procurement benchmarks combined with the performance of organizations at various levels above and below benchmark means provided interesting results (IOMA, 2004). The study identified firms as "world class" if they were either in the top quartile of both efficiency and effectiveness benchmarks, or in the top 10% of either of the two benchmarks (IOMA, 2004, p. 7). Procurement cost as a percentage of spend was 0.72% at world class firms compared to the 1.02% overall benchmark. However, these non-weighted measures may not capture the full picture if they are not presented in conjunction with a quality of output measure. This study sheds light on the impact of high quantity and quality output by finding that the cost to spend ratio is 0.92% for firms in the top 10% of effectiveness and 0.32% for those in the top 10% of efficiency (IOMA, 2004, p. 7). Therefore, although it may seem that higher quality would require higher cost, it does not appear to be the case.

Other findings from this study include that world-class companies use relatively fewer people (54 FTEs per billion dollars spent versus the mean of 104 FTEs per billion dollars spent and that they invest more heavily in technology ($24,308 per FTE as compared to the mean of $7,717 per FTE). Finally, world-class organizations shift investments and resources to higher value activities (16% of costs spent on order processing versus the 22% mean and 11% of costs to supplier management and development versus the 2% mean) (IOMA, 2004, p. 7).

Nelson and Sorber (2006) ask the question, “What is the right size for an agency’s acquisition workforce?” They revisit three benchmarks that can provide insight for federal managers. The first benchmark is the cost-to-spend ratio, which is “an indication of the efficiency of an organization’s operating costs, that is the lower the ratio, the less an agency spends for getting its procurement budget obligated” (Nelson & Sorber, 2006, p. 1). The second benchmark is the spend-per-employee ratio, which is “an indication of the productivity of an organization’s employees; that is the higher the value the more procurement budget is obligated by each employee (Nelson & Sorber, 2006, p. 1). The third benchmark is the spend-to-budget ratio, which is “a measure of the impact that procurement operations have on an agency’s mission, that is, the higher the percentage, the greater the impact” (Nelson & Sorber, 2006, p. 2). For example, when dividing the total dollars put on contract by Army contracting by the total Army budget (personnel, operations cost, etc., plus contracts), you get a sense of the impact that the procurement organization has on the overall agency. The more you buy (rather than make or perform internally) the more important the procurement role is to the overall agency.

Nelson and Sorber (2006) also point out that these measures provide useful starting points, but that they need to be considered within the total context of many other factors such as the employed policies and procedures, the quality of the process outputs, the training and development roles and responsibilities, the turnover, and the degree of customer alignment and satisfaction (Nelson & Sorber, 2006, p. 2).

A series of publications (Sorber & Straight, 1989, 1991, 1995; Straight, 1999, 2000) have made the case for procurement organization evaluation via Performance Unit Costing (PUC). This method considers the cost of operations relative to performance units. *Performance units* are completed actions adjusted for the level of the quality of the output. Examples of quality factors include timely award, timely delivery, fair and reasonable prices, and customer satisfaction (Sorber & Straight, 1993).

PUC is calculated by multiplying the number of *output units* (e.g., contract actions) by an achieved quality index (from .00 to 1) composed of some of the factors above. The result is the quantity of performance units. The number of performance units is then divided into the operating cost of the procurement organization to determine the cost per performance unit (Sorber & Straight, 1993). For example, 900 units of output at an achieved quality index of 0.65 yields 585 performance units. If the procurement organization costs incurred were 10,000, then the cost per performance unit would be $17.09. Obtaining higher output levels while maintaining quality and cost would decrease the performance unit cost. Higher quality achieved at the same cost and output would also decrease PUC. Managers are provided with the insight that increasing quality factors may increase cost, but they may also identify some components of the quality index that can be affected without increasing cost, and other quality factors that can be improved to reduce the cost per performance unit

The PUC methodology allows managers to move away from single factor workload indicators such as procurement lead time, action quantity, or dollars obligated. It combines the resource perspective of the cost to run the organization with the quantity and quality of the work performed. The model also has the flexibility to involve customers in determining quality measures and their relative weights or importance (Sorber & Straight, 1993).

The PUC model seems to improve upon the Workload Index model discussed above by considering the total cost of the operation as the basis for analysis rather than the GS levels of the workforce, which are subject to step level gradation variability (all GS-14s are not the same, nor are they compensated the same). In addition, it allows for weighted workload credit depending on variable types of work output, and most important, it recognizes that all output is not the same (some work is of better quality than other work) (Sorber & Straight, 1993).

In 2007, IBM published a useful guide entitled *Seven Steps of Effective Workforce Planning* (Cotton, 2007). The guide highlights the importance of creating

a forecast by (1) estimating workload and staffing requirements and (2) identifying the likely competencies and skill sets required. This approach stresses the importance of understanding the work prior to estimating the resources necessary to accomplish the work.

> Estimating workload is the heart of demand forecasts. Like the workforce supply projections, workload projections can be based on qualitative models, quantitative models, or a mix of the two. The key outputs of workload projection are the estimate of the type and volume of tasks to be performed and how many people will be needed to perform the tasks. (Cotton, 2007, p. 16)

Cotton (2007) also provides guidance on using quantitative and qualitative techniques to estimate staffing requirements. “High-volume tasks that are mostly standardized are well suited to more quantitative analysis. Specialized, unique, or low-frequency tasks are more suited to qualitative techniques such as expert panel reviews or Delphi analyses” (Cotton, 2007, p. 17).

The concept of involving stakeholders and other experts in a facilitated discussion or Delphi analysis to determine workload factors and weights is seen to be important to the successful implementation and acceptance of a workload model. Including stakeholders in the discussions to determine process times is identified as a key tactic in some of the models that are discussed in the Discussion Items of my report.

Summary

This review of the literature indicates that procurement workforce performance measurement and workload assessment have been areas of study for at least 70 years. There is a wide variety of benchmarks and models available to serve as the basis for government models. However, the review of the government organization literature indicates that the question of workload assessment has been given significantly less attention than output measurement, and that output measurement has been conducted primarily with overly broad measures such as dollars obligated and actions completed.

Further, the preponderance of the workforce modeling activity is now focusing on (1) measuring the size of the organization (impacts of retirement, accessions, etc.), (2) measuring the descriptive statistics or demographics of the workforce, and, to a lesser degree, (3) attempting to measure the capabilities of the organization vis-à-vis competency assessments. While these assessments present leaders with important pieces of information, they are incapable of answering the critical question: How much work will we need to do? Understanding the competencies and capabilities of an organization assists managers in developing a “mixed” human capital strategy; however, the literature indicates that leaders cannot determine the mix of capabilities required without determining the number of workers needed. The two variables affect each other with such great significance that to consider one in the absence of the other is an endeavor destined for failure.

Given the significant number of new workers expected to be hired by DoD contracting organizations in the next several years, leaders are now presented with a tremendous opportunity to determine the optimum method of apportioning resources and measuring performance. A review of workload and performance measures used by various contracting organizations is presented in the following section.

III. Discussion Items

Methodology

The methodology used for this research relied first on an extensive literature review to determine the federal environment and the requirements driving acquisition workforce modeling, the progress made to date on strategic human capital initiatives, and the benchmarks and models developed by scholars and used by government and/or industry. The second major portion of the methodology was a series of over 60 interviews with subject matter experts from government procurement agencies. These interviews were used to obtain insight into the agencies' processes or methods to determine the contracting office workload. When possible, samples of models or processes used by the organization were demonstrated. In this section of the report, the information obtained is presented for each agency in the following manner: (1) background information on the model or process used in the organization, and (2) strengths and weaknesses of the model based on the findings of the literature review.

An attempt was made to identify and gather information about the models used in each DoD major component and in multiple civilian agencies. A limitation of this study is that no central repository of this information was identified in the DoD, and while the Federal Acquisition Institute has established a community of practice with sample models from various agencies, there is no way to confirm that all models in use by federal contracting offices have been identified or discussed in this report. Models deployed by for-profit firms in the private sector were not investigated.

Army

As the sponsor of this research report, the Army Contracting Command (ACC) has a great deal at stake with regard to identifying a workload staffing model. The reality is that the ACC operates in a Tables of Organization and Equipment (TOE) and Tables of Distribution and Allowance (TDA) environment. That is to say,

that the requirements process is mission driven at a macro level and not necessarily workload driven at an organizational level. Once the TOE and TDA are put in place and staff billets are determined, organizations often find themselves staffing to the organization chart and approved positions rather than conducting manpower assessments driven by a workload analysis.

As a relatively new organization, the ACC has the unique opportunity to establish a standard workforce model for the recently amalgamated procurement offices now in the ACC. In order to pursue this objective, it is useful to discuss some of the models used by the organizations that were brought into the ACC organization when it was created.

The first model considered is known as the Forces Command/Training and Doctrine Command (FORSCOM/TRADOC) model. This model is based on dollars obligated. Some of the drawbacks of using this measure as a stand-alone variable were discussed in the literature review. Furthermore, the FORSCOM/TRADOC model excluded many locations and used data that was eight years old, and that had no adjustment for the complexity of work.

The next model considered is the Army Contracting Agency Southern Region Model. This model was more robust, using six variables to account for complexity including (1) action type, (2) the solicitation procedure used, (3) whether the action had specified delivery (versus indefinite delivery and quantity), (4) contract type, (5) the extent of competition on action, and (6) dollars obligated. While this model was only run for a limited population of locations, the use of multiple measures of complexity and the ability to weight these measures may prove to be useful.

The Army has utilized the Air Force Manpower Standard for Operational Contracting (AFMIA, 2001) to conduct some baseline comparisons and to transfer work calculations in the joint environment. This model will be fully discussed in the Air Force section of this chapter.

As the ACC began its existence, several concept plans were required to create the organization. The first was developed to establish the ACC, but it was conducted without rigorous validation or workload analysis. The intent of this concept plan was simply to bring the organizations already in existence together under one umbrella.

The second concept plan released in September of 2009, did use workforce planning data from the Defense Contract Management Agency (DCMA) to determine the activity time required for the Mission and Installation Contracting Command (MICC) and the Expeditionary Contracting Command (ECC) components of the ACC. The DCMA model, Performance Labor Accounting System (PLAS) will be discussed in the DCMA section of this chapter. The 2009 Concept Plan workload analysis substantiated 282 additional Full Time Equivalent positions (FTEs) for the ECC (in non-continental U.S. and expeditionary billets) and 187 additional FTEs for the MICC (in continental U.S. billets).

While the MICC does not have an organic manpower tool, they have run their work production numbers through the Air Force Manpower Standard and found that it resulted in a 1,357-person increase in their current manpower (from 1,157 on TDA to 2,514 per the Air Force model) (H. Wong, personal communication, April 14, 2010).

A third concept plan was scheduled for completion in 2010 to determine the appropriate staff size for the ACC's Life Cycle Management Centers (LCMCs), a second evaluation of the MICC and ECC positions at the installation level, and an evaluation of the ACC headquarters staff requirements. For some of its computations, the third concept plan will utilize a model developed by the U.S. Army Material Systems Analysis Agency (AMSAA).

The AMSAA has been tasked with preparing manpower models for Army acquisition organizations since 1987. In 1999, the Army Material Command directed the AMSAA to baseline all functional areas in the acquisition process, including program management, staff/policy support, and contract administration. The model

developed as a result of this baseline was finalized in 2002. Two clusters developed based on the types of work accomplished, weapon system acquisition, and installation/camp support. Different process action times (PATs) or task completion times were used in each of the two sectors (J. Henderson, personal communication, May 4, 2010).

The primary workload factors used in the AMSAA model are (1) contract actions, (2) solicitations, (3) the ratio of competitive to non-competitive actions, and (4) the number of acquisition systems managed. An interesting aspect of this model is the weighting applied to completive actions. Based on a regression analysis of actions processed, the AMSAA has assigned a 4.5 multiplier to non-competitive (e.g., sole source) contract actions. In other words, a non-competitive action is credited for 4.5 times the process action time allowed for completion when compared with a competitive action (J. Henderson, personal communication, May 4, 2010). The last complete model run was in 2006; however, high-level assessments for the ACC as a whole have been accomplished since then.

In 2007, the USAMA conducted site visits to create a new manning model, which was completed and briefed to the director at Army Contracting. However, the model results indicated that contracting was overmanned by approximately 100 people.As such, the model did not pass the common sense test given the plethora of audits and investigations such as those presented in the previous chapter of this report indicating significant understaffing (D. Alexander, personal communication, April 22, 2010).

Air Force

In 2001, the Air Force published a manpower standard for operational contracting (AFMIA, 2001). The AFMS recognizes key workload indicators such as dollars obligated and total actions completed. It also recognizes that large dollar actions are more complex than small dollar actions, and as such, rewards more process time credit for actions above $100,000 than for those below $100,000.

The model recognizes the impact of expeditionary deployments on an organization, and has a mechanism for awarding manpower for such activity. It also recognizes the importance of the support roles of the contracting organization, and it awards manpower for Government Purchase Card (GPC) oversight, small business program administration, commander's support staff, and IT support. The process time standards were developed by recognizing over 150 individual types of activity in the procurement process and at least 50 types of activity in the contingency contracting environment (AFMIA, 2001). As such, it is one of the most thorough manpower standards produced.

The manpower standard workload formulas can be inserted into standard spreadsheet software applications for ease of computation. However, the parsing of data required to translate existing data into a useable format (e.g., the elimination of non-qualifying contract activity) can be burdensome. Because the Air Force model is more robust in many ways when compared to other agency models, it has been favored as the model of choice by many in non-Air Force DoD agencies, and has become the default model used in joint basing workload transfer negotiations.

Despite the praise this model has received from many users, criticism for the standard has grown in recent years. Of particular note is that the manpower formula is outdated because it is based on the mean (or average) time for executing activities in 1998. As identified in the literature review, actions have become more complex and time consuming to execute in the past 12 years, and the number of complex contract actions has increased while less complex actions have decreased, and have often shifted to GPCs.

Furthermore, critics assert that the manpower formula does not reflect the complexities of today's business processes such as the Management and Oversight of Acquisition of Services Process (MOASP), the Performance-based Service Contracts, the Standard Procurement System, the competitive sourcing for multiple installation support, the increased post-award contract administration burden of service contracts on installation contracting offices, the strategic sourcing efforts

which require much more pre-award activity in order to develop commodity strategies, and the increased contingency deployments.

In addition, the types of work that receive no credit in the Air Force model are a concern for many. For example, there is no credit given for dollars obligated or actions processed that are modifications to contracts, nor for processing orders off of centralized contracts, nor for awarding or processing utility contracts. The work associated with these efforts can be substantial, yet it is not credited in the Air Force model. The rationale for withholding credit is that post-award and order processing was "built in" to the original time standards. In other words, in the manpower standard, when you are given credit for awarding a contract, you also earn all the necessary manpower to administer the contract. Given the changes in complexity and number of these types of actions since 1998, and the tremendous growth in multi-year contracts (which were much more rare in 1998), it calls in to question whether the original built-in process times are still an accurate reflection of the actual time required to complete the activities today. A final critique of the Air Force model is that it is perceived to be similar to the time and motion studies conducted in the mid-twentieth century. Time and motion studies focus on increasing the efficiency in a process and measuring the time required to complete tasks. Although the models measure the time required to accomplish process tasks, they do not take into account the quality of the outputs that result from the process.

In an attempt to address some of these criticisms and update the model, the Air Force undertook a Capability-based Manpower Standard (CMS) study in 2006. Significant issues were encountered during the 2006 study. Among them, modelers had a difficult time retrieving data from the new SPS system because the existing workload factors had been designed for the previous archival system, the Base Contracting Automated System (BCAS), and they were not compatible with the SPS. The nature of the study (Tier 1, as opposed to a more in-depth time and motion analysis) did not allow the modelers to fully address many concerns. Furthermore, specialized contracting actions (generally in support of tenant or non-local units) and the tasks of program management flight (primarily post-award focused) were

removed from the calculations and were not considered in the analysis. Having the model not recognize this workload, is a concern for those organizations that have the responsibility to complete it. In addition, the commander support staff, enlisted superintendant, and first sergeant credits were also removed and no credit was given for the work performed by those individuals. Some progress was made in areas such as an updated contingency deployment measurement process.

The revised model proposed the calculation of workload based on two primary workload factors: authorized base population and centralized contracting dollars. While the new model did identify justification for an additional 145 positions, concerns were expressed by multiple stakeholders. These concerns focused on the methodology selected to count base population, with particular concern about counting students assigned to the installation. In addition, concerns regarding the failure to account for the necessary work of unit leadership persuaded the Air Force contracting community to decide not to implement the revised standard and to request further study and a follow-on CMS at a later date.

Separate and distinct from the Air Force operational manpower standard, is the Air Force Workload Assessment Model (WAM) for weapon systems contracting developed by the Aeronautical System Center (ASC) at Wright Patterson AFB, Ohio. This model relies on stakeholder assessments of the number of hours required for tasks at differing dollar thresholds. For example, an organization may earn 245 hours to complete a sole source contract from $1million to $5 million, but earn 575 hours to complete a contract from $25 million to $50 million. Similar threshold-based earned hours are awarded in service contract, competitive contract, and delivery order categories as well. In all, there are 49 differing actions that organizations can earn credit for. There are 16 modification types (supplemental agreements, funding actions, etc.), 10 undefinitized contract types (letter contracts, terminations, option exercises, etc.), 15 definitization actions (task order, delivery order, undefinitized contract action [UCA] definititization, etc.), and 8 miscellaneous actions (Freedom of Information Act [FOIA] requests, congressional inquiries, etc.). Stakeholder groups

meet to assign process times for each of these types of work (D. Baker, personal communication, March 22, 2010).

Workload is determine through an annual data call exercise in which each buyer (with workload) on the installation (approximately 700) completes a spreadsheet by simply identifying the contract or program they are working on, and then identifying, via dropdown boxes, each of the actions they (1) accomplished in the past three months, and (2) are scheduled to complete in the coming three months. The assigned hours are not displayed to the buyers, and all workload assessment computations are calculated after submission. The data are aggregated through contracting offices and reviewed by contracting leaders so that they can concur with the input (D. Baker, personal communication, March 22, 2010).

The data are further refined by assigning earned credit based on where the action is within the acquisition cycle. In other words, buyers earn partial credit for completing any of the 12 different portions of larger tasks of work in progress (e.g., 25% of related task hours for reaching *RFP issued*; or 70% for *negotiations complete*). Further refinements occur based on the complexity factor assigned to the program office. Through stakeholder discussions, factors such as congressional visibility, program maturity, higher headquarters or PEO review thresholds, technical complexity, personnel mix and history, etc., are considered, and an indirect multiplier factor from 0.1 to 0.4 can be added to the workload input to compensate for additional workload due to program complexity (D. Baker, personal communication, March 22, 2010).

Once the indirect complexity hours are added to the total hours earned for the six-month period, the result is divided by 880 (half of the 1,760 annual AF work hour standard) and the result is the number of positions earned for that contracting office. WAM calculates hours earned for actual buyers with workload. It does not calculate supervisors, procurement technicians, senior-level functional advisors, or contracting officers without workload. In order to recognize that trainees and interns often require more resources than the value they generate, these personnel do not have

any workload that they process assessed in WAM, neither do their available work hours count against available WAM earned hours for the organization (D. Baker, personal communication, March 22, 2010).

A weakness of WAM is that it requires a manual data call once a year and a periodic validation by stakeholders of the earned hours attributed to workload types. It also relies on individual procurement specialists to accurately input their workload, determine the appropriate complexity level for the work, and determine the degree of completion of the total effort. In addition, it does not account for types or grades of workforce personnel. Forty hours earned through an action covers one FTE for a week, whether it is a GS-9 with two years of experience, or a GS-13 with twenty years of experience. To account for this, if a contracting office has a significant departure from the normal distribution of grade levels, the indirect complexity factor is designed to compensate for that shortfall.

The WAM model has received positive reviews from many. In 2010, the director of the Air Force Material Command (AFMC) (of which ASC is a subordinate organization) directed that all contracting centers in the AFMC select an organization with which to beta test the WAM model. The beta test was intended to be the first step in implementing the WAM model throughout the AFMC. Some resistance to change has been identified with this project. Organizations have requested that they be allowed to modify the standards associated with the model action types to better reflect the time associated with their environment. So far, five additional model variations have been proposed; one each for the Air Logistics Centers or depots, the AF Nuclear center, the Air Force Research Laboratory, the Electronic Systems Center, and one for the remaining product centers (J. Fruhwith, personal communication, September 15, 2010). The AFMC contracting leaders' immediate goal is to get an initial workload model in place for each of its contracting organizations. As such it appears prudent to utilize the flexibility of the WAM model and tailor the task process times to reflect the local mission environment. Such a customized approach should help to facilitate initial deployment of the model throughout the AFMC.

Navy

The entire Air Force contracting community has an operational contracting workload standard. The Army would like to work toward having a workload standard. However, the Navy is not pursuing a Service-wide standard, but rather is allowing System Commands (SYSCOMs) to develop a standard if they find it to be of use.

For example, at Naval Facilities Engineering Command (NAVFAC) there is no model because workload is seen as an art form not suited to mathematical modeling. Projected workload assessment is based on the work in place and on historical information. NAVFAC utilizes a Position Management Board to review requirements and ensure that they track with projected workload volume.

Naval Supply Systems Command (NAVSUP) is an example of a SYSCOM that does have a model in use to measure work. The *Time to Produce* (TTP) model was originally developed by the Fleet Industrial Supply Center (FISC) Norfolk at their Philadelphia location. The model uses PATs developed by two subject matter expert groups (representing simplified acquisitions and large acquisitions). The TTP model relies on data collected each month on completed actions. The data set includes product and service definitions of the action. The data are placed into simplified or large acquisition buckets. The headcount for the actions is tracked at the FISC level.

A separate productivity model measures the actual productivity of the contracting specialists via a tally of simplified and large contract actions completed. Complexity is accounted for in this model by placing more complex actions in the “large acquisition” bucket, irrespective of the dollar level (S. Pierce, personal communication, May 7, 2010). Both the TTP model and the productivity model can be used to assess activity at the FISC-wide level, at the aggregate FISC level, or at the individual operating location. Due to the wide variability in average productivity per year and the wide variability in the nature of work performed, the models are best used to compare year over year performance trends at individual locations rather than to assess each location’s capability relative to other locations (S. Pierce, personal communication, May 7, 2010)

Defense Contract Management Agency

After the Air Force Manpower Standard for operational contracting was developed, most DoD agencies moved away from attempting to implement operations research-based manpower models. Instead, the environment of working-capital-fund models drove some agencies toward development of unit-cost models. The Defense Contract Management Agency (DCMA) developed a Resource Utilization Model called an RUC and used it to assess workload and balance the workforce. However, in the post–Cold War environment when agency billets were being cut, gaps between the earned manpower identified in the RUC and the actual manpower on hand at the organization had a negative impact on morale. The perception that the agency would not be manned to the level required by the workload was one of the reasons that the use of RUCs was discontinued (R. Sawlsville, personal communication, March 30, 2010,)

Today the DCMA uses the Performance Labor Accounting System or PLAS to capture work performed. The PLAS requires DCMA personnel to track their hours on a daily basis and attribute them to a program or contract. Much like a timecard system, the PLAS allows the DCMA to track the hours and processes performed in support of specific contracts and aggregates information into multiple reports including types of contracts supported, agencies supported, processes performed etc.

The PLAS can also be used to calculate relative efficiency level comparisons between operating locations. This data are used at the headquarters level to track progress toward 3% efficiency improvement goals agency wide (D. Peterson, personal communication, April 20, 2010). The PLAS also allows calculations for earned value management in different functional areas. This information can determine if the capacity is adequate in a functional area such as quality assurance or cost and price analysis.

The PLAS feeds information into the DCMA’s Enterprise Planning system, which allows the agency to calculate the projected workload, as well as the type of

support environment (e.g., pre-contract activity, post-award activity, contingency activity, etc.) and as a result, the workforce required (R. Sawlsville, personal communication, March 30, 2010). The DCMA is developing new position management tools to better calculate DCMA requirements (K. Smith, personal communication, April 21, 2010). The DCMA continues to work toward identifying top-level workload indicator variables so that they can better plan for future requirements.

The PLAS is a rich source of information for DCMA leaders. Its ability to capture actual touch times required to administer contracts is useful. The DCMA has assisted other organizations in base lining their workload by providing PLAS data on process times. However, some say that navigating through its 100 process codes and hundreds of contract numbers is not particularly user friendly. The difficult interface is suspected of reducing the accuracy of information collected because the system relies on buyers to seek out contract types and process codes on a daily basis. If buyers perceive the interface to be too complicated, and utilize the system option to reproduce yesterday's entry as today's input, then this eventuality serves as a threat to data accuracy.

Federal Acquisition Institute

As discussed in the literature review, the Federal Acquisition Institute has been tasked with developing a community of practice and sharing workload models utilized by federal civilian agency contracting offices. The FAI has made seven different models available for agencies to use to develop workload assessments.

The first model is the Project-based Combined Model developed by the Department of Energy. This model identifies staffing needs based on project-level characteristics. These characteristics include the annual value of project work to be executed, the type of project, the project complexity, the manner of execution, the project phase, the level of regulatory involvement, and the degree of external influence. These variables provide a range of staff appropriate for the project characteristics.

The second model is the Multidimensional Model being developed by the Department of Veterans Affairs. The model focuses on tasks in acquisition planning; pre-award and post-award activities.

The third model, the Program-based Model, is also under final development from the Department of Transportation–Federal Aviation Administration and will use historical program data to derive recommended staffing levels for major acquisition programs.

The fourth model is a regression model that provides two options to the user. Option one is to baseline agency spend to FY 2000. The model indicates that one contract specialist is required for each $5 million in spend. In option two, the regression model indicates that for each 45 contracts awarded, one additional GS-1102 FTE is required. This model is very limited in application, does not consider complexity factors, and may better serve as a notional comparison model than an actual workforce staffing model due to its lack of specificity.

The fifth model is the Volume-based Surge Tool developed for use as a result of the American Recovery and Reinvestment Act. The model allows the use of agency work volume growth from a baseline spend year and can be refined through human capital planning and analysis.

The sixth model is the Transaction Model based on agency procurement spend and contract manager staff counts from 2000–2008. The model requires input of actual spend and workforce for each year. An average productivity per contract manager over the eight-year period is computed and divided into current FY projected spend. The result is the number of contract managers required for this FY. The model assumes that the number of contract specialists input into the model reflects contract specialists with a contract workload (as opposed to policy, oversight, small business, etc.).

The final model is the Conceptual Combination Model developed by the FAI. This model appears to be the most thoroughly developed of the seven options. It is

agency specific and requires agencies to identify complexity, risk, workforce productivity, and other elements. Agencies can adjust weights ratios and factors to better represent the agency operating environment. The model uses a baseline workforce factor of $15.8 million for the average productivity of contract managers. Of note is that the model uses a factor calculated for the years 1993–1996 as a time period in which contracting offices were considered optimally staffed for contracting professionals.

Complexity is captured through an assessment of the percentage of simplified contract actions, the percentage of firm fixed price contracts, the percentage of definitive contract actions, and the degree of competition in agency contracts. Risk is determined to be low, medium, or high based on the spread of actions across the fiscal year, the propensity of cost and schedule changes, the number of Inspector General (IG) and GAO issues, the progress on defining the acquisition workforce and turnover, and contract monitoring. The complexity model seems to capture many factors that are worth further examination as to their contribution to better defining workforce capabilities, especially with regard to mission risk.

Department of Homeland Security

In 2004, the Department of Homeland Security (DHS) conducted a high-level staffing analysis of procurement resources to facilitate the largest government reorganization in U.S. history. The analysis consisted of a cost-to-spend ratio analysis using FY 2002 total obligations and salary expense. The study also calculated spend-per-employee using total obligations and number of employees. It compared the findings to benchmarks published by the CAPS. Each of these measures is discussed in the literature review.

The study found that the DHS buying offices' cost-to-spend ratios ranged from 0.20% to 2.28% with a mean of 1.06%. The study used cost-to-spend ratios available from other federal buying offices for comparison. The comparison ratios ranged from 0.71% at NASA–Goddard and 0.86% at the Department of Housing and Urban Development (HUD) to 2.31% at the Environmental Protection Agency (EPA).

The mean of comparison agency cost-to-spend was 1.35%. The CAPS benchmark for mean cost-to-spend in the aerospace industry is 2.21%. The DHS compared favorably in both range and mean relative to the benchmark and comparison agency cost-to-spend ratios (Sorber & Bodnar, 2004).

When looking at spend-per-employee, DHS organizations ranged from $2.8 million to $44 million with a $12.4 million mean. Comparison agencies ranged from $3 million to $8.9 million and had a mean spend-per-employee of $6 million. The DHS had a higher average and a much wider range of spend-per-employee than the comparison agencies. By comparison, the CAPS benchmark mean for aerospace industry procurement was $5.3 million.

The researchers then considered the upcoming planned FY 2004 obligations to calculate FTEs required. By dividing the planned obligations by the $5.3 million and the $6 million agency and industry benchmarks, the researchers identified a range of imputed FTEs appropriate for meeting the projected contracting office workload.

However, since the researchers calculated average spend-per-employee as $12.4 million, it seems that $12.4 million would have served as a reasonable estimate, rather than the $5.3–$6 million estimate that was used in the study. The larger number could have at least been used to illustrate an alternative position with a slightly higher risk associated with it should the DHS have wished to accept that risk. Given that the factor is double the benchmarks used, the argument for accepting some risk beyond $6 million spend-per-employee would be warranted.

Using the lower risk benchmarks, the authors identified a requirement for 220 FTEs. When factored with the average DHS procurement salary of $150,650 (the planning average salary provided by the DHS), the result was a FTE budget of $32.9 million. Given that this is the lowest risk profile, $32.9 million should be considered the maximum possible FTE budget .

A final finding of the study was the identification of the fees charged by agencies (such as GWACs, GSA, GovWorks, etc.) for performing contracting work for the DHS. The fees ranged from 0.75% to 8%. The researchers calculated an average fee of 2.5% and used it to illustrate the cost that would be incurred if requirements were sent to outside agencies for obligation. The researchers found that applying a 2.5% average fee to the projected obligation total for FY 2004 would result in $43.5 million in fees. When compared to the worst case FTE budget of $32.9 million, it is clear that use of outside agencies should be minimized in this example. However, for organizations with cost-to-spend ratios above 2.5%, a compelling argument for seeking outside support could be made.

While the DHS study provides a great deal of insight into procurement workforce evaluation, it should also provide motivation for procurement leaders to ask, “What is my cost-to-spend ratio?”, if for no other reason than to better understand the implications of using outside procurement organizations.

NATO Maintenance and Supply Agency

The North Atlantic Treaty Organization (NATO) Maintenance and Supply Agency (NAMSA) is the executive agent for procuring NATO expeditionary requirements. They have operated as a fee-for-service agency with a variable fee depending on the level of support provided to that particular customer.

The NAMSA is included in this report to illustrate that the challenge of workload assessment and staffing is not unique to U.S. federal or Military procurement agencies. As a result of a dialogue with NAMSA procurement leaders, I have determined that they too are searching for an effective workload model. Furthermore, like many U.S. federal agencies, they are struggling to determine whether to manage contracting workload by inputs (funding received) or outputs (actions completed).

The current NAMSA process to determine workload is more complex and time consuming than the process used in the DoD. In brief, the process requires

approximately 18 months to complete. It begins with sending workload questionnaires to customer countries. Based on the responses to those surveys, a workload forecast and staffing proposals are prepared. The proposals are reviewed by NAMSA/Supreme Headquarters Allied Powers Europe (SHAPE) and then coordinated with senior leaders. The business case that is presented must provide compelling evidence to support every workforce position requested, not just requests for additions to previous manpower. Finally, all computations and logic must be based on actual ratios (i.e., number of employees to workload), technical estimates of the work (i.e., processing or completion times) and trend data of workload indicators (i.e., using database figures where applicable).

This complicated procedure is labor intensive, and in most cases dated by up to 18 months when implemented. Needless to say, our NATO partners at NAMSA are very interested in any progress that can be made on the workload assessment and staffing challenges that are ubiquitous throughout contracting organizations.

Joint Basing and BRAC

Here is a final observation regarding the emerging importance of workload modeling. The absence of a common model to assess contracting office workload is not only problematic because it hinders the allocation of resources to locations where they are most in need, but also because it is problematic when joint operations are pursued or are required to combine operations and transfer workload from the responsibility of one Service to another. The absence of a common model has been evident in the case of joint basing requirements. Under BRAC requirements, several contracting offices (for example Ft Dix and McGuire AFB, San Antonio Area, Joint Base Andrews, and others) have been required to merge operations.

While the transfer of work is always an intricate process, it would be much more straightforward if there were a common DoD workload assessment model. By and large the contracting work that is done at the installation level is 95% similar irrespective of whether it is performed by the Army, the Navy, or the Air Force.

Because of on-going joint deployment operations, the argument could be made that the Services operational contracting processes are becoming more alike as time passes.

Recent negotiations to determine the amount of manpower required to accompany transferred workload in joint basing operations are perplexing and frustrating. As it turns out, the Air Force model was almost universally utilized to assess workload. Not because it is without flaw, as we have seen, but because relative to the other options available, it is (1) validated (by Air Force Manpower Agency) and (2) an active model currently in use by a Service.

There have been observations during joint basing negotiations that the Air Force Manpower Standard covers some tasks that other services may not consider to be the responsibility of their contracting personnel. A review of AFMS 12A0 (AFMIA, 2001) indicates that there are few if any tasks that are Air Force specific. Rather they are tasks inherent in sound requirements definition, acquisition planning, business advising, customer service, contract negotiation, award, and administration. There have been instances during joint basing workload transfer negations when one Service has asked that manpower identified via the Air Force model calculation be reduced in recognition of tasks in the model that other Services do not perform.

That there are tasks that are performed by one service and not another seems to be another compelling reason for not only a single DoD contracting manpower standard, but also a standard contracting process task list. As joint contracting operations continue to increase, there should not be any question about the expectations of contracting personnel, no matter what uniform they wear or Service they work for.

Limitations

An attempt was made to identify and gather information about the models used in each of the DoD's major components and in multiple civilian agencies. A

limitation of this study is that no central repository of this information was identified in the DoD for workload modeling or staffing methodologies. The Federal Acquisition Institute has established a community of practice with sample models from various agencies; however, there is no way to confirm that all of the models in use by federal contracting offices have been identified or discussed in this report. Models deployed by for-profit firms in the private sector were not investigated. This research is further limited by the manner in which models were identified and background data collected. Because there is no community of practice in the DoD, and no registry of subject matter experts, there may be models in use or subject matter experts that were not identified or interviewed for this report. The establishment of a community of practice would create great value for those charged with workload assessment and manpower assessments in the acquisition workforce. The findings and recommendations identified as a result of this research are presented in the following section.

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IV. Findings and Recommendations

The primary goal of this research was to identify differing methods used to assess workload and staffing in Army contracting organizations as well as in the Department of Defense (DoD), Federal Civilian, and other commercial contracting organizations. This report has identified the key elements of various DoD Services' contracting workforce staffing models. This research investigated each of the Services' workload and resource assessment methodologies in the operational (and in some cases weapon system) contracting environments. In addition, industry practices in measuring workload and procurement organization production were reviewed.

Secondary research goals included identifying potential opportunities whereby the existing methodologies could be used to more accurately capture the amount and nature of the work performed by contracting organizations, to ensure that the complexity of the work being performed at various stages within the contract process was reflected in the workload models, and to ensure that the level and quality of work was reflected in performance measurement models.

The information in this section presents the major findings identified during the course of this research. For each finding, a recommendation is made as to whom the finding should be addressed. The findings and recommendations are presented in two tables. Table 1 identifies recommendations that fall within the purview of the ACC to address. Table 2 presents recommendations that require coordination and action at the level of the Department of Army, the DoD, or higher in order for successful implementation.

Table 1. Findings and Recommendations for Action at the Army Contracting Command Level

Findings	Recommendations
F1. When workload assessment is performed, it is most often conducted at the sub-agency level. This approach provides maximum flexibility for procurement organizations to develop their own priorities and factor weights reflecting the priorities of their mission. Notwithstanding the benefits of developing models at lower levels, the resulting inconsistency of findings and methodologies leads to confusion when attempting to develop and deploy human capital strategies at the agency level.	**R1.** Strategic intent developed at the highest level possible and closely aligned workload assessment and staffing processes should be pursued, developed, and implemented. A workload model should be developed that captures strategic intent and ensures that standard methods are used throughout the agency, but that allows for some flexibility if necessary to adjust weights depending upon the local operating environment.
F2. The current emphasis in workforce analysis is on competency assessment, and demographic trend analysis, while relatively little effort is being placed on workload assessment and appropriate workforce size.	**R2.** A thorough assessment of the ideal levels of both workforce size and workforce competency is essential. Focusing on one and not the other is insufficient. An assessment of contracting workload must be accomplished in order to determine ideal size and competency mix.
F3. The growing complexity of contracts, particularly service contracts, has rendered "total contract actions" a poor measure of workload.	**R3.** Avoid the use of workload measures such as dollars obligated or actions completed in the absence of additional control ratios, standardized base computations, or measures for complexity and output quality.
F4. The lack of available information relative to workforce requirements, size, quality, and mix makes it difficult to assess whether more workers, more highly skilled workers, or a different mix of workers would improve acquisition outcomes.	**R4.** Develop and implement a strategy to obtain more detailed information on workload requirements, with emphasis on defining the expected workload.

F5. The CAPS provides 11 meaningful procurement organization benchmarks including the following: (1) the total dollars spent by a procurement organization as a percent of total firm budget (how much of an organization's needs are acquired via contract and what is procurement's relative impact/importance to the total organization); (2) supply management operating expense as a percent of total spend (how much does it cost to spend each dollar of supplies or services that the organization procures); (3) supply management operating expense per supply management employee (the total cost—pay, training, benefits, etc.—of the average member of the workforce); (4) total spend per supply management employee (contract dollars awarded by the average procurement specialist); (5) annual spend on professional training per supply management employee; (6) professional training hours completed per supply management employee; (7) supply management group retention rate; (8) cost reduction savings as a percent of total spend; (9) cost avoidance savings as a percent of total spend; (10) average order/action processing cost; (11) average cycle-time (in days) from	**R5.** Procurement offices should identify the CAPS benchmark(s) that are closely aligned with their strategic objectives and conduct benchmark comparisons to identify opportunities to improve and identify the best targets on which to focus resources. As detailed in F6 and F7, Measures (1) total spend as a percentage of Service budget; (2) operating expense as a percentage of total spend; and (4) total spend per procurement specialist represent opportunities to gain useful information quickly at relatively low cost.

requirement approval to issuance of order/contract.	
F6. Procurement organization cost per dollar obligated emerges from the literature review as one of the most promising measures of performance (CPDO or cost-to-spend). The DHS workload assessment example presents straightforward staffing opportunities via cost-to-spend analysis.	**R6.** The ACC should conduct a cost-per-dollar-obligated or a cost-to-spend benchmark analysis of the organization to determine whether it would provide value through a regular measurement and trend analysis.
F7. The spend-to-budget ratio, is "a measure of the impact that procurement operations have on an agency's mission, that is, the higher the percentage, the greater the impact." (Nelson & Sorber, 2006, p. 2) For example, when dividing the total dollars put on contract by Army contracting by the total Army budget (personnel, operations cost, etc. plus contracts), the result provides a sense of the impact that the procurement organization has on the overall agency. The more the organization buys (rather than makes or performs internally) the more important the procurement role to the overall agency.	**R7.** Conduct a spend-to-budget analysis to determine (and demonstrate) the ACC impact on Army operations. Track this measure over time to determine trends.
F8. The Performance Unit Costing methodology allows managers to move away from single factor workload indicators such as procurement lead time, action quantity, or dollars obligated. It combines the resource perspective of the cost to run the organization with the key output measures of the quantity and quality of the work performed. The model also has the flexibility to involve customers in determining quality measures and their relative weights or importance.	**R8.** Determine the efficacy of the Performance Unit Cost model in ACC contracting. Identify which quality measures are appropriate and conduct a pilot test to determine whether the PUC model provides an opportunity to assess performance ACC wide.

F9. The ACC is a relatively new organization. As such there is a unique opportunity to establish a standard workforce model for the recently amalgamated procurement offices now in the ACC. I	**R9.** Establish an ACC operational workload model with stakeholder participation and implement its use as soon as possible.
F10. The Air Force model is more robust in many ways when compared to other agency models. It has been favored as the model of choice by many in non-Air Force DoD agencies and it has become the default model used in joint basing workload transfer negotiations. However, critics observe that its mean time calculations are 12 years old and were calculated in an era of less complex contract activity and fewer service contracts.	**R10.** The ACC should use caution when utilizing the Air Force Manpower Standard without considering additional complexity adjustments.
F11. The Air Force WAM model is a promising model for measuring contract workload for organizations with access to subject matter experts to define process action times, and which are willing to commit the time required for buyers to complete annual workload self reports.	**R11.** The ACC should conduct a pilot test of the AF Workload Assessment Model (WAM) as a possible model for use in LCMCs and other weapon system contracting offices.
F12. The Navy Time to Produce and productivity models are useful models to allow local contracting activities to measure their trend performance against their previous performance. Given the variable complexity of work by location, use at a higher level may be limited.	**R12.** The ACC should consider further analysis of the Navy Time to Produce and productivity models to determine applicability to contracting activities in the ACC.
F13. The PLAS is a rich source of information for DCMA leaders. Its ability to capture the actual touch times required to administer contracts is useful. The DCMA has assisted other	**R13.** When utilizing the DCMA PLAS information, consider the potential for skewed data and ensure the similarity and applicability of functions and work performed before relying on the PLAS

organizations in base lining their workload by providing PLAS data on process times. However, some say that navigating through its 100 process codes and hundreds of contract numbers is not particularly user friendly. The difficult interface is suspected of reducing the accuracy of information collected because the system relies on buyers to seek out contract types and process codes on a daily basis.	system results.
F14. The FAI has a variety of workload models, and two of them, the project-based and the conceptual combination model, provide rigorous workload assessments beyond the level of some of the other models reviewed.	**R14.** Assess the usefulness of the FAI's Project-based and Conceptual Combination models. Identify opportunities to leverage these models in the development of an ACC model.

Table 2. Findings and Recommendations Requiring Action or Cooperation at the Department of Army Level or Higher

Findings	Recommendations
F15. The logic behind the announced additional 10,000 acquisition workforce hires and 10,000 converted acquisition workforce positions is not readily evident or available for public review.	**R15.** In the interest of transparency, publish the logic and mathematical basis for the additional 20,000 acquisition workforce positions now in process. If this information is already available, make it easily accessible.
F16. DoD guidance is consistently vague on workload and staffing size, and uses language such as "appropriately sized cadre" without providing tools or methodology to assess workload and staffing.	**R16.** DoD should form a contracting workload and performance measurement working group to identify and share tools and methods (similar to the FAI community of practice and toolbox) within DoD procurement community. Congress has made significant funding available for improving acquisition workforce capabilities, and the DoD has

	focused on training and competency assessment. However, given the arrival of 20,000 new acquisition workforce personnel, identifying funding for robust workload and performance models is urgently required.
F17. No systematic approach is currently used to determine contracting office workload.	**R17.** The DoD should develop and publish strategic intent for contracting offices along with closely aligned processes to measure workload. If the DoD is not willing to pursue this opportunity, then the Army or the ACC should proceed at their levels.
F18. While the FAI has been a leader in workforce competency assessment, self-reported competency assessments are at risk of self-report bias and assessment inflation.	**R18.** If the FAI and the DoD continue to focus on competency assessment, they should seek to control for self-report bias by conducting objective interviews or scenario-based competency assessments with a sample of the population. Subsequently, comparing them to self-assessment competency scores would provide useful validation baselines regarding the accuracy of the self-reported competency assessments.
F19. The *2010 DOD Strategic Human Capital Plan Update—The Defense Acquisition Workforce* discusses five tools to assess workforce demographics and trends, but no tool for the consistent assessment of workload.	**R19.** The DoD should establish a community of practice similar to the FAI and make workload models available to all Services. Standardization of models and an integrated information technology system would also allow reduced data collection cost.
F20. The recent experiences from joint basing workload transfer negotiations highlight the need for a DoD contracting workload assessment tool and a standard contracting process task list. As contracting operations become more joint, there should not be any question about the expectations of contracting	**R20.** Establish a common set of contract tasks and customer expectations to facilitate contracting in the joint environment. Establish or leverage an existing joint working group to develop a workload model(s) for the DoD and share information.

personnel, no matter what uniform they wear or what Service they work for.	

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